REMARKS/ARGUMENTS

Favorable reconsideration of this application is respectfully requested.

Claims 16-23, 25-28, and 30-33 are pending in the present application, Claims 16, 18, 20, 22, 25, and 30 having been amended.

In the outstanding Office Action, claims 16-23, 25-28 and 30-33 were rejected under 35 U.S.C. §101(a) as lacking utility and under 35 U.S.C. §112, first paragraph, as the claimed invention is not supported by an established utility and one skilled in the art would not know how to use the invention.

First, the Applicant greatly appreciates the interview with Examiner Kumar held on December 14, 2006. There was a discussion of the claims in light of the Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility. First, it should be noted that the Guidelines do not permit dissection of a claim into elements and consideration of the elements in isolation: "every limitation in the claim must be considered" and "the claim as a whole must be considered" (emphasis in original).[1] It is further inappropriate to dissect the claims into old and new elements and ignore the presence of old elements in the analysis. *Id.* at page 10.

Regarding utility, the claimed invention as a whole must be useful and accomplish a practical application: a "useful, concrete and tangible result." *Id.* at page 4. For "useful," the utility of an invention must be specific, substantial and credible. A concrete result is one that is substantially repeatable or can produce the same result again. A tangible result is where the invention has a practical result, as opposed to an abstract result. *Id.* at 20-22.

The Office Action questions "what is the usefulness of estimating channel and direction of arrival as claimed?" As explained in page one of the present specification, an antenna can cancel interference or form a beam in the direction of arrival of a signal. Beam

[1] See page 9 of the Guidelines.

formation is applied to mobile telephony, for directing a beam from a base station to a mobile station. Also, knowing the characteristics of the channel used in the mobile communication is useful for exploiting diversity in reception through knowledge of the phase rotation and attenuation undergone along different signal paths. In the prior art, using these concepts typically involved two estimation steps and did not use all of the available information. See page 2 of the present specification. See also the discussion beginning on line 13 of page 4 where the invention, as one example, is described in the context of mobile communication where signals are propagated along different paths to make up a transmission channel. Knowledge of the characteristics of the paths provides improved communication. The invention is further useful in that it can more efficiently and effectively determine phase rotation and attenuation as compared to the prior art.

Clearly, the present invention is directed to at least the practical application of mobile telephony and produces a useful result of improved mobile communication. In the method claims, a step of forming a beam is recited which further represents a useful, concrete and tangible result. The result of the claimed process is further repeatable and not abstract. The claimed apparatus accomplishes a repeatable result of receiving a signal with an array of antennae estimating certain parameters of the signal, which is also not abstract. One skilled in the art would understand both the usefulness of the claimed invention and how to apply the claimed invention.

The Office Action, on the other hand, states that the claimed invention is not useful because it manipulates only numbers, abstract ideas or concepts, and is not applied to any "appropriate subject matter." The application contains device and process claims, which will be treated separately.

Device claim 25 recites a device having an array of antennae, three estimating means, and a plurality of filters. Claim 25 further recites that the filters are disposed at the output of

the array and that estimating means receive the output of the filters. During the interview the Examiner pointed to the functional language of claim 25 as what the applicant invented, asserting it could be software and thus not tangible. However, as discussed above, the claimed invention as a whole must be considered and it is inappropriate to dissect a claim and ignore elements, such as the array of antennae. There can be no doubt that claim 25 recites a machine or manufacture that is a statutory class of patentable subject matter. There is an array of antennae and structural elements disposed to receive the output of the antennae on signal propagation paths. Claim 25 recites three means which are clearly structural elements. Moreover, the device of claim 25 produces the useful, concrete and tangible result of extracting useful parameters from the signal received by the array of antennae leading to improved mobile communications.

It is noted that Examiner Kumar, in the interview, agreed to reconsider claim 25 in light of the recitation of the estimation means as part of the claimed device. The issue in the mind of Examiner Kumar was whether the claimed filters were merely software. The presence of the array and the estimating means, agreed to be structure, cannot be ignored. Moreover, as pointed out in the interview, the filters are disposed on a signal path and disposed to receive the output of the antennae, and the estimating means receive the output of the filters. Software alone, or some abstraction, while able to perform a filtering function cannot embody the recited filter. The claimed filters are disposed at the output of the array of antennae and are adapted to signal propagation paths. As stated in the specification on page 12, the claimed filters may be implemented as a processor or as processors.

As discussed above, the claimed device has utility in communication systems, one example being mobile telephony. It estimates the phase rotation, attenuation and angle of arrival which are all useful in signal communication. The device is further repeatable in

operation and not abstract. Claim 25 meets the requirements of 35 U.S.C. §§101 and 112, first paragraph.

Claim 30 also recites a device having an array of antennae, three estimators and a plurality of filters. It was questioned during the interview whether the estimators and filters could be considered structure, and not merely software. As was pointed out in the interview, the filters are disposed to receive the output of the antennae and the estimators receive the output of the filters. Software alone, or some abstraction, cannot make up the recited filter. The antennae produce an electrical signal that requires structure for its reception. As stated in the specification on page 12, the claimed estimators and filters may be implemented as a processor or as processors. Moreover, the array of antennae cannot be ignored or dissected out of the claim. Claim 30 clearly recites a statutory machine or manufacture and thus defines statutory subject matter. The device of claim 30 has utility, as described above. Claim 30 also meets the requirements of 35 U.S.C. §§101 and 112, first paragraph.

Attention is also directed to claim 26 and 31 which recite a plurality of beam formation means and a plurality of beam formers, respectively. Claims 26 and 31 clearly recite structural elements that produce a beam, a further useful, concrete and tangible result.

Method claims 16, 18, 20 and 22 each have utility and produce a useful result, as discussed above. Each claim also recites forming a beam using the array in a direction based upon the angle of arrival. Each of these claims clearly recites reception of a signal and formation of a beam using the array and is a statutory process. Withdrawal of the rejection of the method claims is respectfully requested.

Accordingly, the Applicant respectfully submits that the present application is in condition for allowance and a favorable decision to that effect is respectfully requested

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